

AMENDMENTS TO THE CLAIMS

1. (currently amended) A method of cooling a stack formed by stacking a plurality of unit power generation cells, said unit power generation cells each including an electrolyte electrode assembly and a first separator and a second separator sandwiching said electrolyte electrode assembly, said electrolyte electrode assembly including an anode electrode, a cathode electrode, and a solid polymer electrolyte interposed between said anode electrode and said cathode electrode, the method comprising the steps of:

cooling said stack by immersing said stack in an electrically insulating liquid coolant inside a stack container case, wherein a plurality of protrusions protruding toward said stack are provided on an inner surface of said stack container case such that front ends of said plurality of protrusions surround said stack, and said protrusions are exposed from a surface of the liquid coolant; and

condensing, by a condenser, the liquid coolant which has been vaporized at said stack container case by cooling said stack, and returning the condensed liquid coolant to said stack container case.

2. (previously presented) A method according to claim 1, wherein the liquid coolant is boiled into vapor in the nucleate boiling state.

3. (previously presented) A method according to claim 2, wherein a liquid having a boiling temperature lower than an operating temperature of said stack by 10°C to 25°C is used as the liquid coolant.

4. (previously presented) A method according to claim 2, wherein a lower alcohol or a solvent of fluorine compound is used as the liquid coolant.

5. (previously presented) A method according to claim 1, wherein the liquid coolant is supplied into said stack.

6. (currently amended) A polymer electrolyte fuel cell including a stack formed by stacking a plurality of unit power generation cells, said unit power generation cells each including an electrolyte electrode assembly and a first separator and a second separator sandwiching said electrolyte electrode assembly, said electrolyte electrode assembly including an anode electrode, a cathode electrode, and a solid polymer electrolyte interposed between said anode electrode and said cathode electrode, said polymer electrolyte fuel cell further comprising:

a stack container case containing said stack; and

a condenser provided in said stack container case,

wherein said stack is immersed in an electrically insulating liquid coolant inside said stack container case to cool said stack; [[and]]

a plurality of protrusions protruding toward said stack are provided on an inner surface of said stack container case such that front ends of said plurality of protrusions surround said stack, and said protrusions are exposed from a surface of the liquid coolant; and

said condenser condenses the liquid coolant which has been vaporized at said stack container case by cooling said stack.

7. (previously presented) A polymer electrolyte fuel cell according to claim 6, wherein coating is applied to at least one of a surface of said condenser and an inner surface of said stack container case.

8. (previously presented) A polymer electrolyte fuel cell according to claim 7, wherein the coating comprises fluorine resin.

9. (previously presented) A polymer electrolyte fuel cell according to claim 8, wherein the coating comprises polytetrafluoroethylene.

10. (previously presented) A polymer electrolyte fuel cell according to claim 6, wherein said stack includes a cooling plate having at least one groove for supplying the liquid coolant into said stack.

11. (canceled)

12. (previously presented) A polymer electrolyte fuel cell according to claim 6, further comprising a trapping section for trapping the condensed liquid coolant at said condenser, and a circulation mechanism for allowing the liquid coolant to flow from said trapping section back to said stack container case.